

2022

Missouri Wild Turkey Harvest and Population Status Report



Missouri Department of Conservation
Science Branch



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Population Status

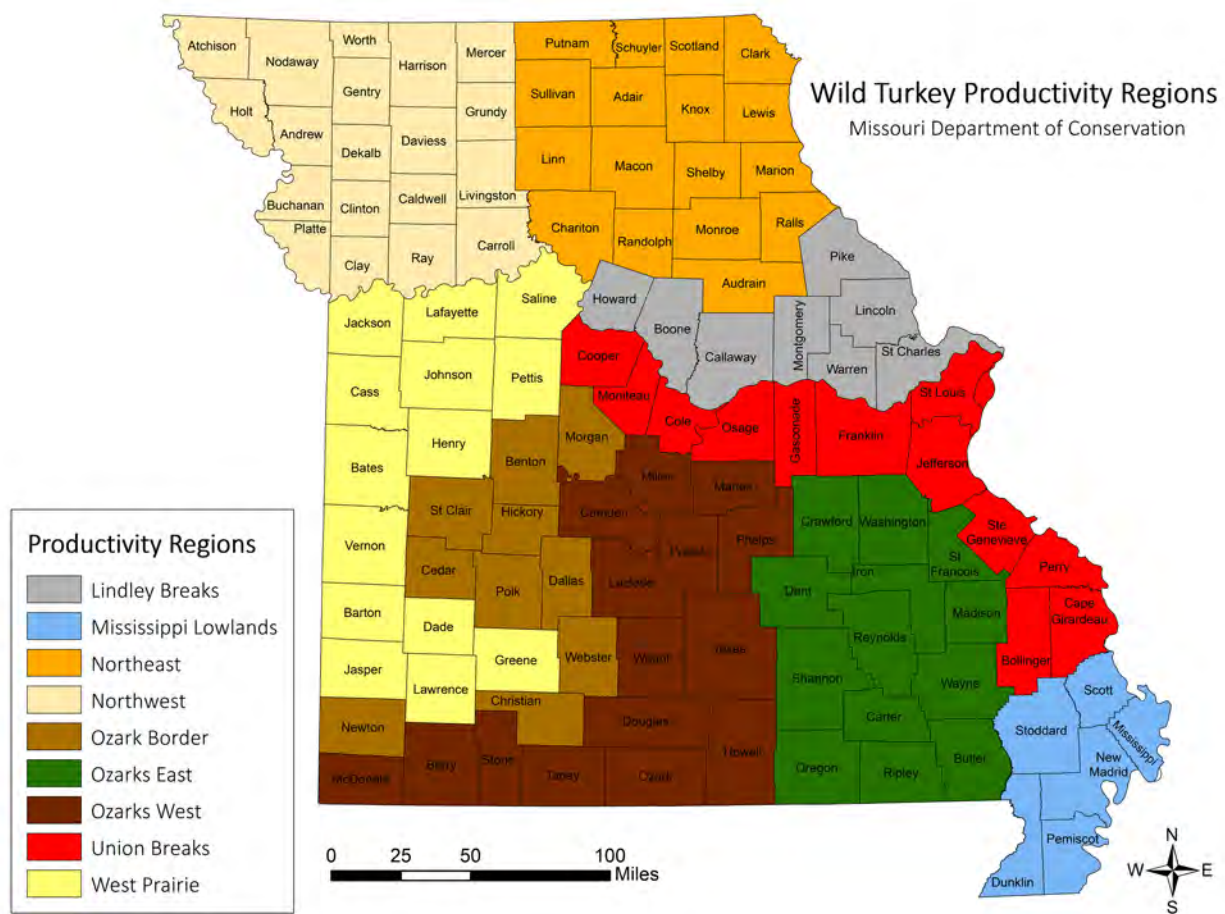
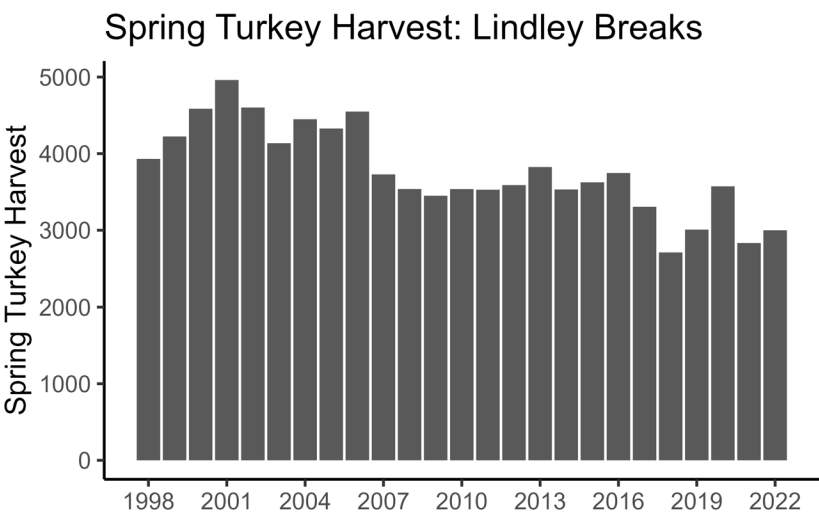


Figure 1. Turkey Productivity Regions in Missouri. Regions consist of counties grouped by similar land cover composition.

Lindley Breaks Region

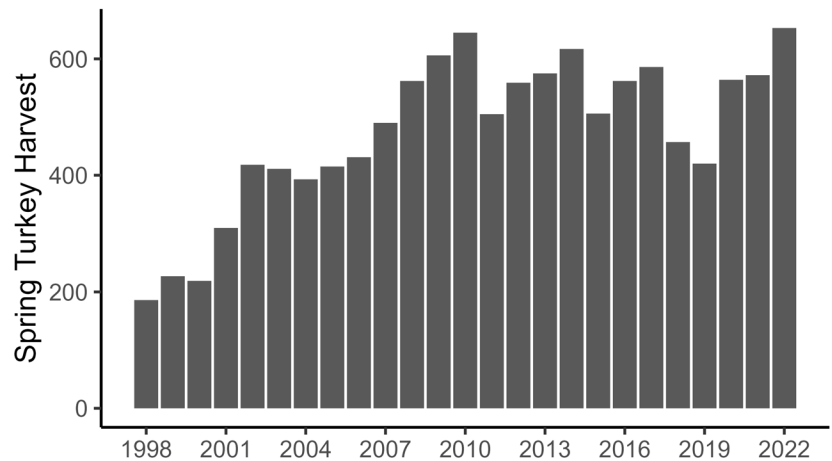
Turkey abundance in the Lindley Breaks Region peaked in the early 2000s before declining about 30% from 2001-2009. Abundance stabilized from 2010-2015 before declining sharply from 2016-2018. Though harvest has increased the past two years, the five-year trend shows stability and the ten-year trend indicates a decline in the Lindley Breaks Region.



Mississippi Lowlands Region

The turkey population in the Mississippi Lowlands Region has increased during the 2000s. However, turkey abundance in this region has always been low compared to the other regions, and because of this, harvest tends to vary greatly on an annual basis. The five-year trend indicates an increasing population while the ten-year trend shows signs of stability in the Mississippi Lowlands Region

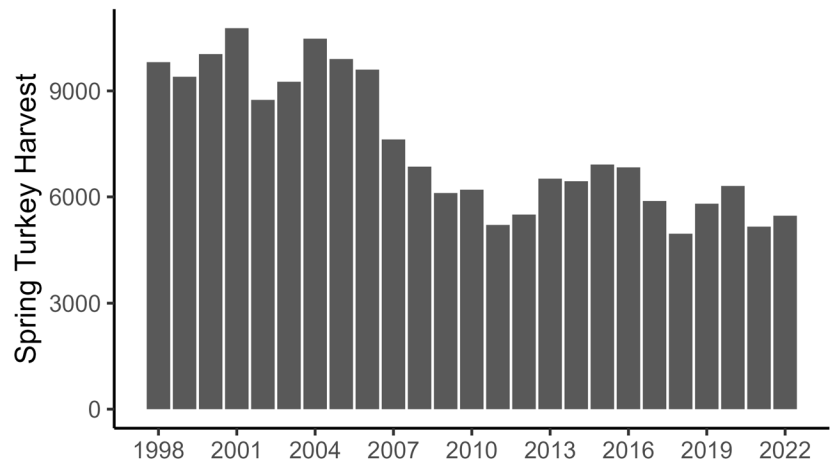
Spring Turkey Harvest: Mississippi Lowlands



Northeast Region

The Northeast Region experienced six consecutive years of poor production, leading to a roughly 40% decline in abundance during the late 2000s. However, improved production in 2011 and 2014 caused abundance to increase and stabilize. Harvest did decline from 2016-2018 but has increased in recent years. The five- and ten-year trend indicates a stable population in the Northeast Region.

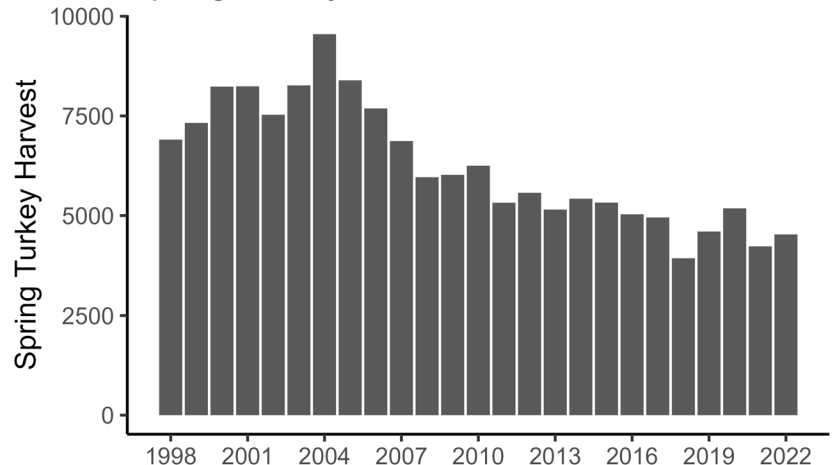
Spring Turkey Harvest: Northeast



Northwest Region

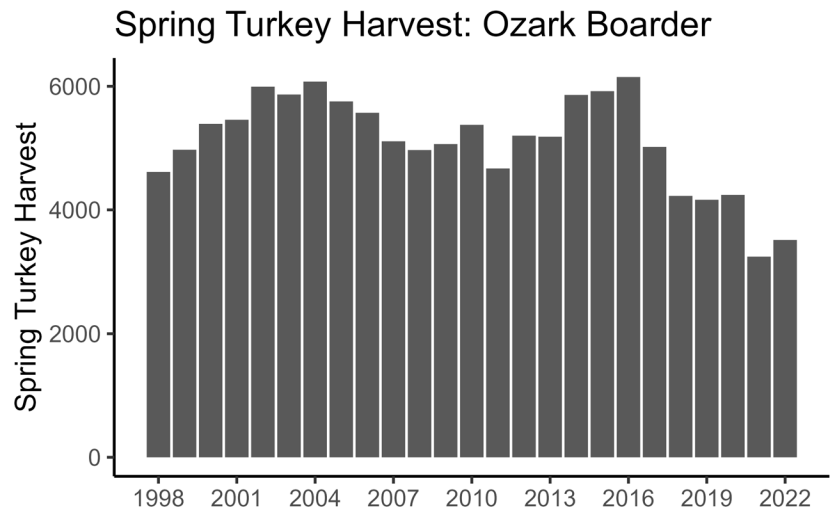
The Northwest Region experienced a sharp decline in abundance in the late 2000s due to poor production. Abundance appeared to stabilize from 2011-2015, and after a decline in harvest from 2017-2018, harvests in recent years have stabilized. The five-year spring turkey harvest trend in the Northwest Region indicates a stable population, while the ten-year trend indicates a declining population.

Spring Turkey Harvest: Northwest



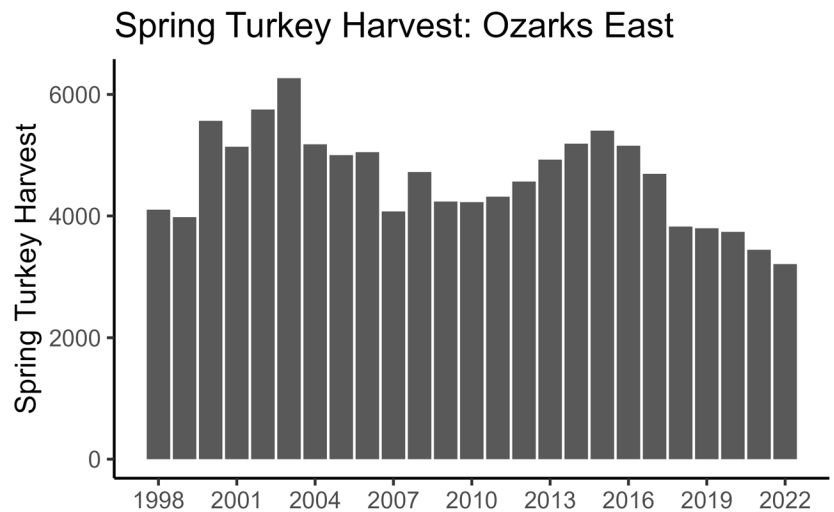
Ozark Border Region

Turkey abundance in the Ozark Border Region peaked in the early 2000s before declining during the mid-to-late 2000s. Abundance increased from 2011-2016 before sharply dropping from 2016-2018. Harvest numbers took another downturn in 2021 with a modest increase in 2022. The five- and ten-year spring turkey harvest trends in the Ozark Border Region indicate a declining population.



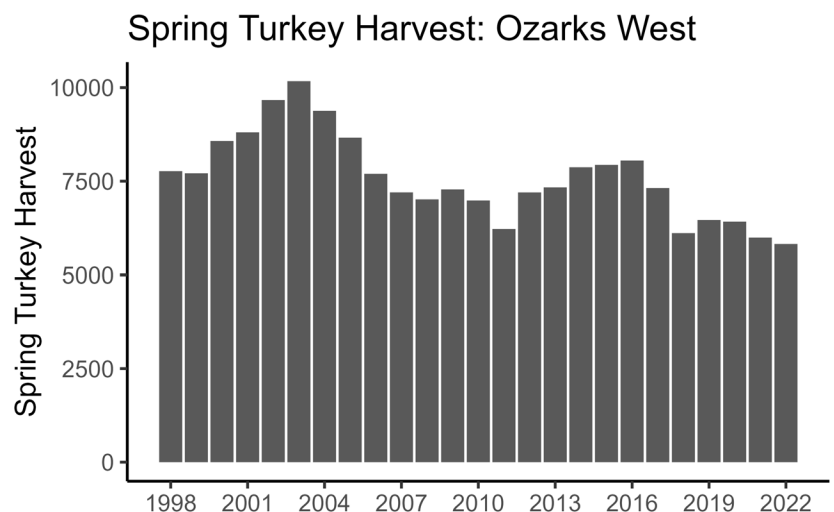
Ozarks East Region

The turkey population in the Ozarks East Region declined during the late 2000s, but after several years of improved production, abundance increased from 2011-2015. The harvest declined again from 2016-2018 and after a few years of reletive stability, declined again in 2021 and 2022. The five- and ten-year spring turkey harvest trends in the Ozarks East Region indicate a declining population.



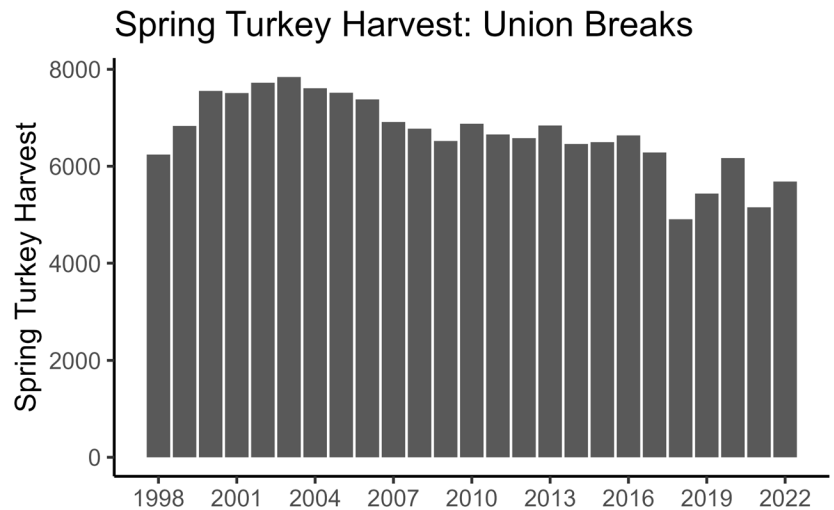
Ozarks West Region

Turkey abundance in the Ozarks West Region peaked in the early 2000s, followed by sharp declines during the mid-to-late 2000s. Improved production resulted in an increasing trend in spring harvest from 2011-2016. The harvest declined again from 2016-2018 but has leveled-off in recent years. The five-year trend indicates stability, while the ten-year spring turkey harvest trend in the Ozarks West Region indicate a declining population.



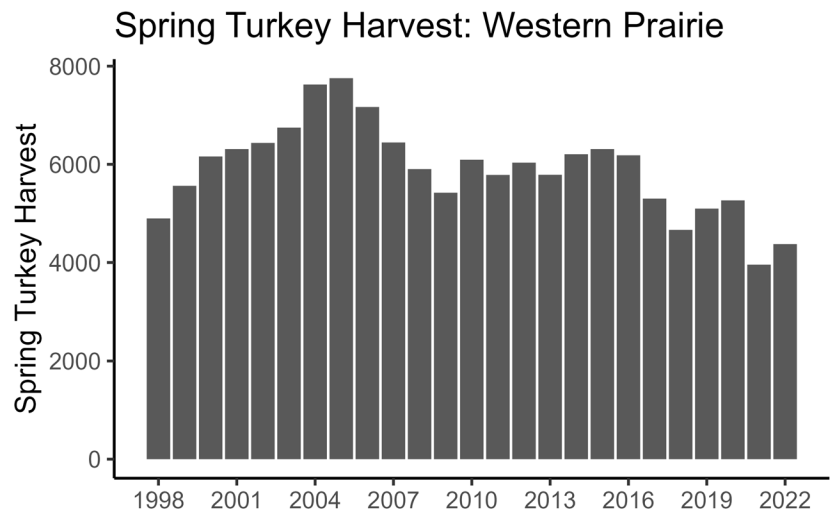
Union Breaks Region

Turkey abundance in the Union Breaks Region peaked in the early 2000s. Abundance gradually declined during the mid-to-late 2000s and was stable from 2009-2017. After a sharp decline in harvest during 2018, harvest has increased during the past couple of years. The five-year trend shows stability and the ten-year trend indicates a decline in the Union Breaks Region.



West Prairie Region

The West Prairie Region turkey population peaked in the early-to-mid 2000s, and after declining from 2006-2009, abundance increased from 2010-2015. Harvest did decline from 2016-2021 but did tick up in 2022. The five- and ten-year spring turkey harvest trends in the West Prairie Region indicate declining abundance.



PRODUCTION – WILD TURKEY BROOD SURVEY

The Missouri Department of Conservation (MDC) has been conducting a Wild Turkey Brood Survey annually since 1959. During the survey, Department staff and citizen volunteers record observations of hens, poults, and gobblers during June, July, and August. Turkey sightings are recorded on observation cards, which the MDC mails to participants at the beginning of each survey month. By recording observations of hens and poults, survey participants provide information that serves as an index to turkey production. It is through this survey that the MDC determines the success of each year's turkey hatch. Turkey observations are collected at the county-level and analyzed by Turkey Productivity Region (**Figure 1**), which are counties grouped by similar land cover composition. Conservation Department staff determines the percentage of hens observed with and without poults, and the average number of poults per hen for those hens observed with a brood. Observations of hens and poults are used to determine the poult-to-hen ratio (PHR), which is the average number of poults per hen. The PHR includes observations of hens with a brood and those observed without a brood.

In 2022, MDC staff and citizen volunteers recorded observations of over 70,000 turkeys during the three-month survey. The 2022 statewide poult-to-hen ratio (PHR) was 1.0, which was the same as the 2021 PHR and 9% greater than the previous five-year average (**Figure 2, Table 1**). However, this year's PHR was 14% lower than the 10-year average and 21% lower than the 20-year average (**Table 1**). Regional PHRs in 2022 ranged from 0.6 in the West Prairie Region to 2.4 in the Mississippi Lowlands Region (**Figure 1, Table 1**). Compared to the five-year averages, production in 2022 was higher in the Lindley Breaks, Mississippi Lowlands, Northeast, Ozark Border, and Ozarks West Regions but lower in the Northwest, Ozarks East, Union Breaks and West Prairie Regions (**Table 1**)

At the statewide level, 38% of hens were observed with a brood, which was down from 40% in 2021 but was 9% greater than the 5-year average (**Table 2**). The percentage of hens observed with a brood ranged from 30% in the West Prairie Region to 59% in the Mississippi Lowlands Region. Statewide, the average number of poults per brood was 3.9, which was down from 4.0 in 2021 and equal to the five-year average. The average number of poults per brood ranged from 3.4 in the Ozark Boarder Region to 5.4 in the Mississippi Lowlands Region.

Table 1. Index (poult-to-hen ratio) of Missouri wild turkey production by Turkey Productivity Region (**Figure 1**). Data were obtained during the Conservation Department's Wild Turkey Brood Survey in 2022 and are compared to the previous year and the average for periodic intervals.

| Productivity Region | 2022 Index | 1-Year (2021) Change | 5-Year (2017-2021) Change | 10-Year (2012-2021) Change | 20-Year (2002-2021) Change |
|------------------------------|------------|----------------------|---------------------------|----------------------------|----------------------------|
| Lindley Breaks | 1.2 | No Change | 13% | -2% | -12% |
| MS Lowlands | 2.4 | No Change | 58% | 62% | 26% |
| Northeast | 1.3 | 30% | 16% | 4% | 1% |
| Northwest | 1.0 | -23% | -21% | -26% | -27% |
| Ozark Border | 0.9 | -10% | 15% | -14% | -22% |
| Ozarks East | 0.8 | -20% | -13% | -40% | -46% |
| Ozarks West | 1.0 | -9% | 25% | -8% | -19% |
| Union Breaks | 1.0 | -9% | -2% | -15% | -23% |
| West Prairie | 0.6 | -14% | -17% | -36% | -44% |
| Statewide^a | 1.0 | No Change | 9% | -14% | -21% |

^aStatewide totals include observations where Productivity Region was not recorded on the survey form.

Table 2. Data obtained during the Missouri Department of Conservation’s Wild Turkey Brood Survey, listed by Turkey Productivity Region (**Figure 1**), 2022.

| Productivity Region | % Hens w/ Brood | Average Brood Size | Poult-to-Hen Ratio | Gobbler-to-Hen Ratio |
|------------------------------|-----------------|--------------------|--------------------|----------------------|
| Lindley Breaks | 45% | 3.8 | 1.2 | 0.8 |
| MS Lowlands | 59% | 5.4 | 2.4 | 0.8 |
| MS Lowlands | 43% | 4.1 | 1.3 | 0.7 |
| Northwest | 39% | 3.5 | 1.0 | 1.0 |
| Ozark Border | 40% | 3.4 | 0.9 | 0.8 |
| Ozarks East | 31% | 3.8 | 0.8 | 0.4 |
| Ozarks West | 37% | 4.0 | 1.0 | 0.6 |
| Union Breaks | 40% | 4.0 | 1.0 | 0.6 |
| West Prairie | 30% | 4.0 | 0.6 | 0.9 |
| Statewide^a | 38% | 3.9 | 1.0 | 0.7 |

^aStatewide totals include observations where Productivity Region was not recorded on the survey form.

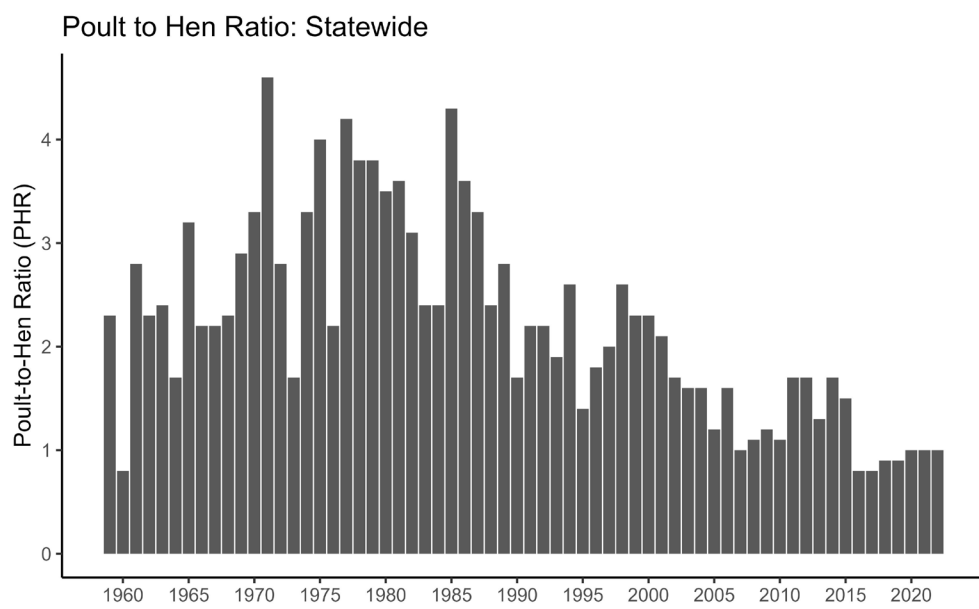


Figure 2. Missouri statewide poult-to-hen ratios derived from the Wild Turkey Brood Survey conducted in June, July, and August, 1959-2022.

HARVEST

2022 Spring Turkey Season

During the 2022 youth spring turkey season, which took place April 1-2, hunters harvested 2,896 turkeys. This harvest total represented a 4% increase from the 2021 youth season and was 5% higher than the previous five-year average youth season harvest total. In 2022, a total of 15,923 youth permits were sold which included 15,069 resident youth and 854 non-resident youth permits. The total number of youth permits sold in 2022 was nearly identical to the number sold in 2021.

During the 2022 regular spring turkey season, which took place April 17 – May 7, hunters harvested 33,359 turkeys. This harvest total represented an 5% increase from the 2021 regular season. Juvenile male turkeys represented 19% of the regular season harvest, which was 16% greater than the previous five-year average (**Figure 3**). The total 2022 spring

turkey harvest, including both the youth and regular seasons was 39,151 (**Figure 4**). This harvest total was 5% higher than the 2021 harvest total and 7% lower than the previous five-year average. Harvest was concentrated in the middle of the state, with areas in the northwest, southwest and southeast seeing lower harvest (**Figure 5**).

Total permit sales for the 2022 spring turkey season (99,682; excluding no-cost landowner permits) were 3% lower than in 2021 and 2% lower than the previous five-year average (**Figure 4**). Spring turkey permit sales in 2022 included 91,422 (92%) resident permits and 8,260 (8%) nonresident permits. An additional 21,461 no-cost permits were distributed to landowners. The total number of unique spring turkey hunters in Missouri in 2022 was 118,564. The number of spring turkey hunters in 2022 was 3% less than in 2021 and 8% lower than the previous five-year

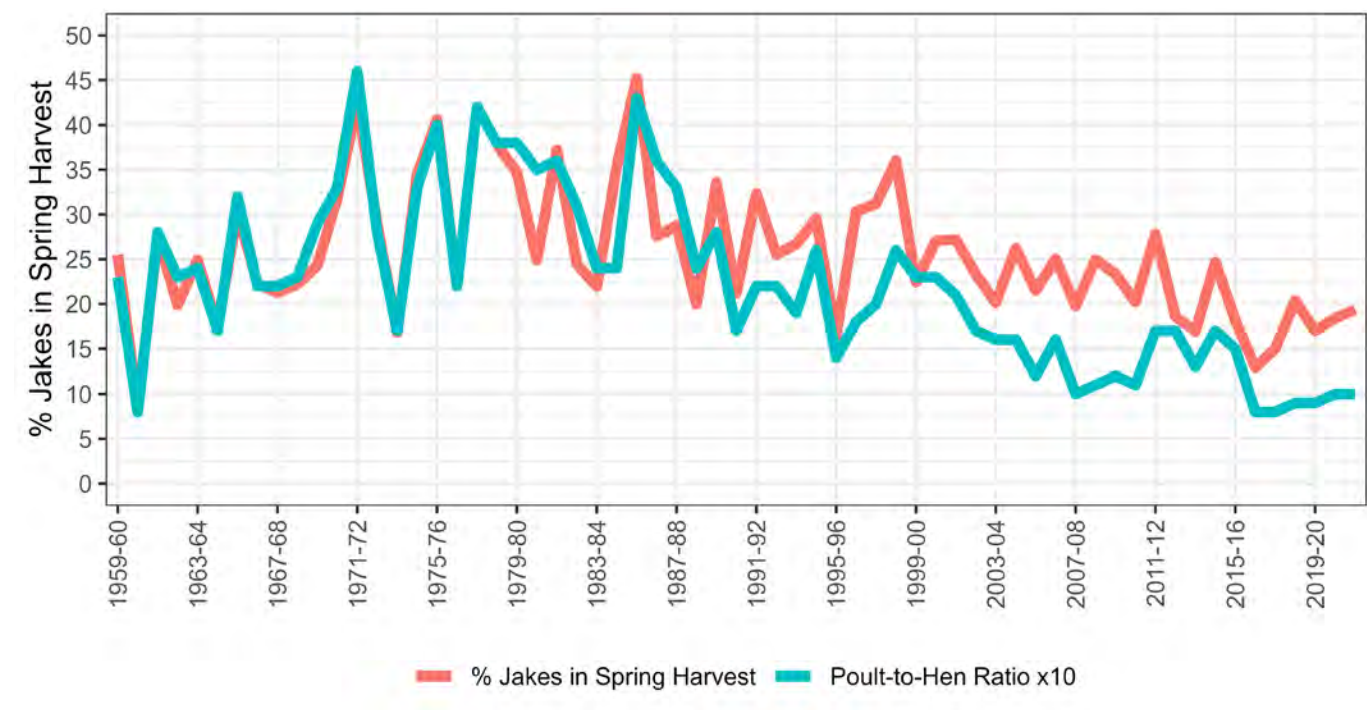


Figure 3. Missouri’s statewide poult-to-hen ratio multiplied by 10, compared with the percentage of jakes in the following year’s regular season spring harvest, 1959-2022.



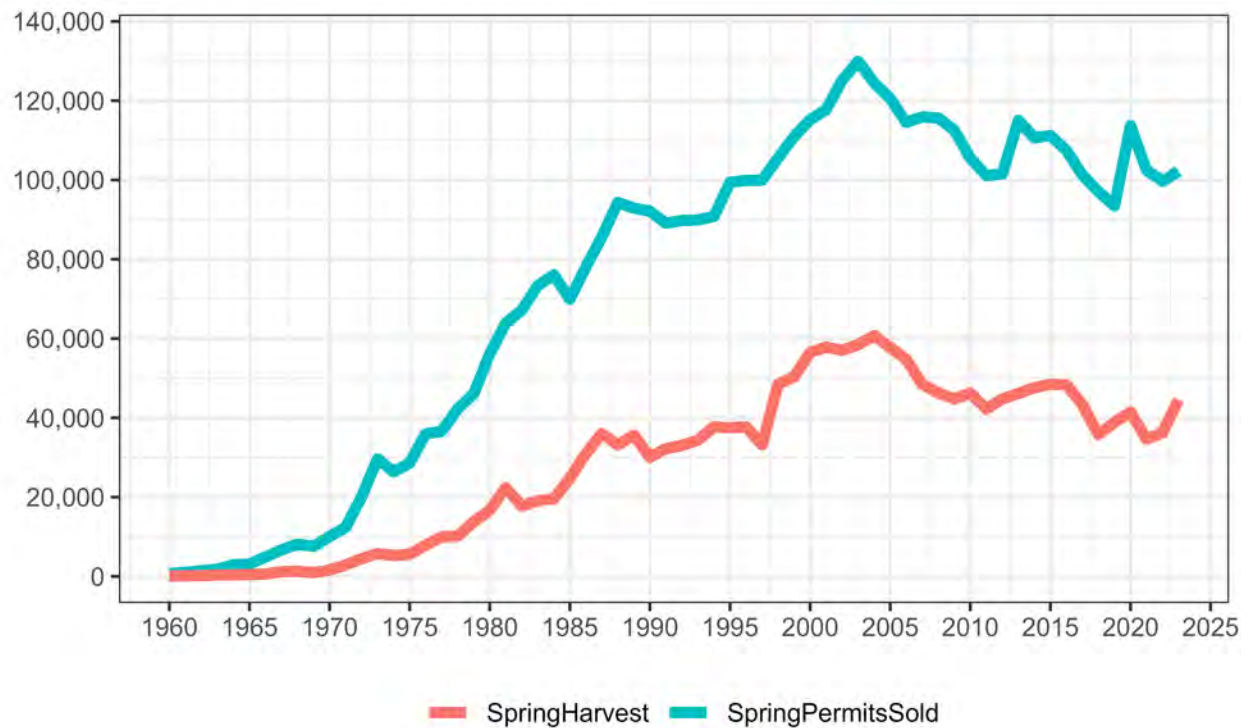


Figure 4. Number of wild turkeys harvested during the spring season (youth and regular season) in Missouri and the number of turkey hunting permits sold for the spring season, 1960-2022. Permit sales do not include no-cost landowner permits.

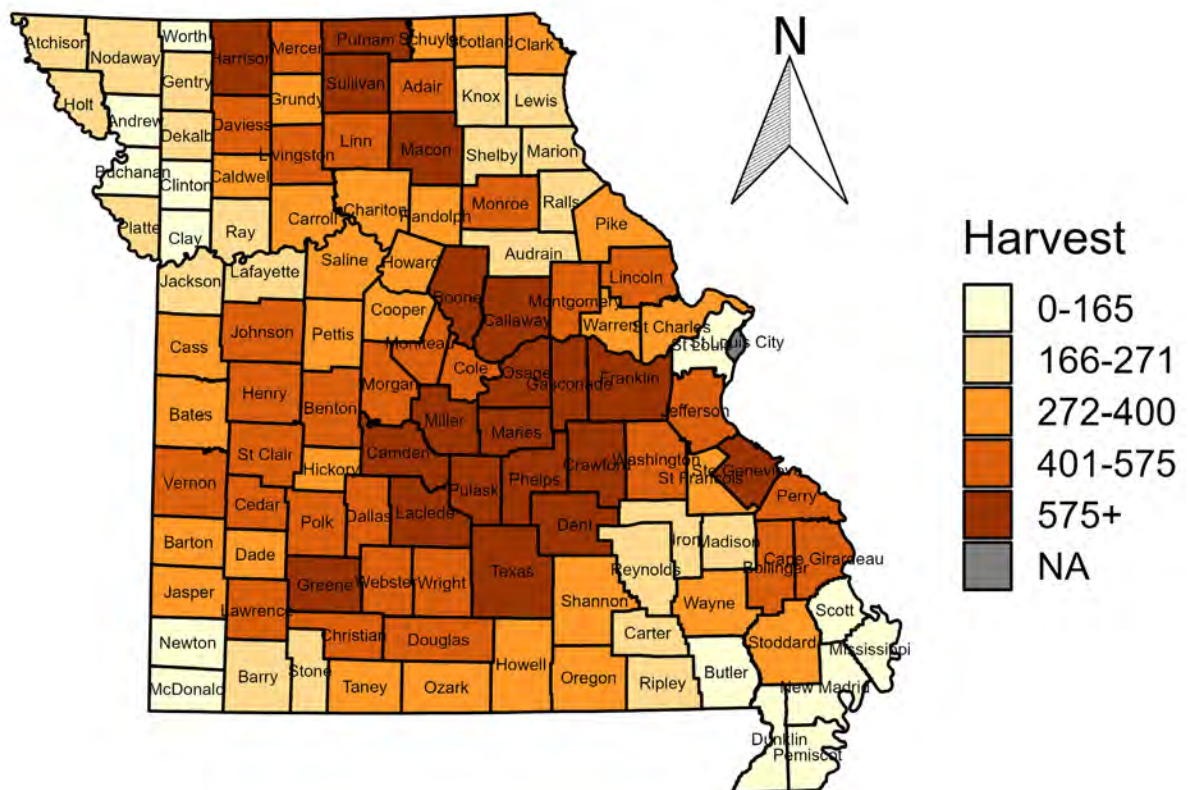


Figure 5. Total (youth and regular season) spring wild turkey harvest in Missouri, 2022.

2020 Fall Firearms Turkey Season

The 2022 fall firearms turkey harvest total of 1,711 was 7% lower than the 2021 harvest total and was 22% below the previous five-year average (**Figure 6**). Most fall firearms harvest occurs south of the Missouri River, though areas in North Central Missouri see above average harvest as well (**Figure 7**). Permit sales for the fall firearms season (n = 12,043) were nearly identical to the number sold in 2021. There is, however, a long-term declining trend in fall firearms turkey hunting participation in Missouri.

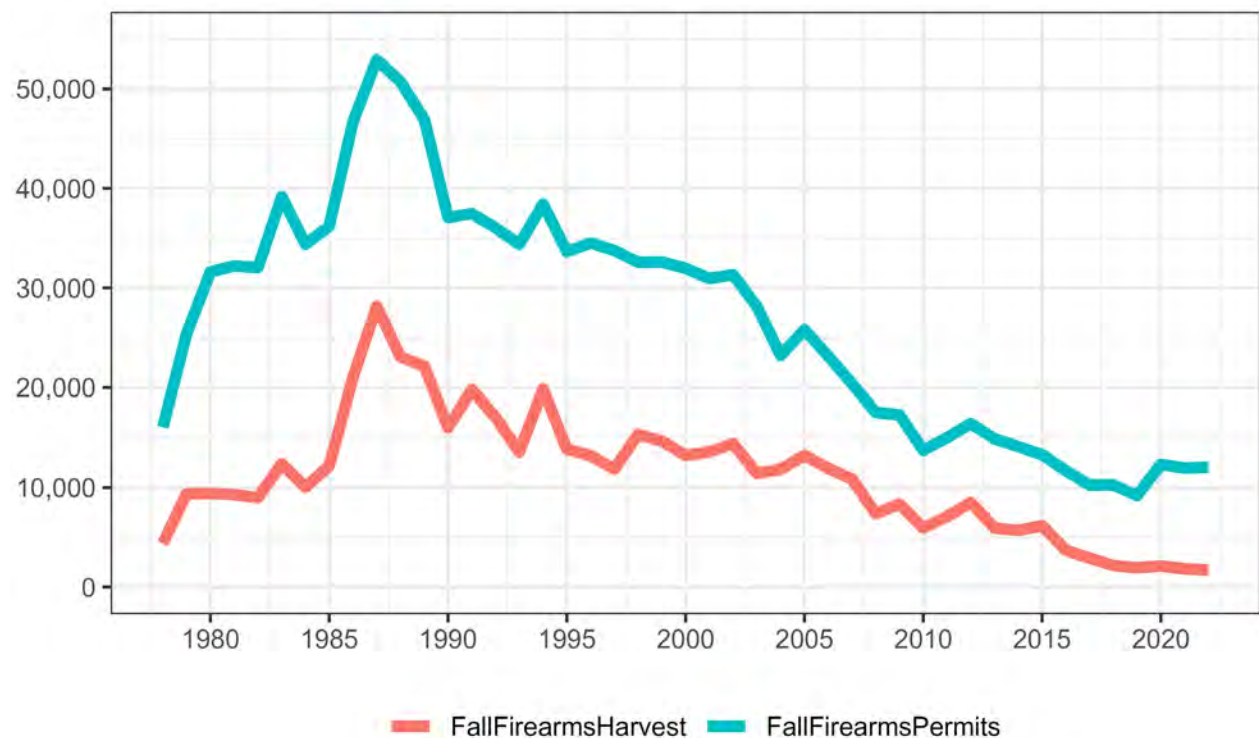
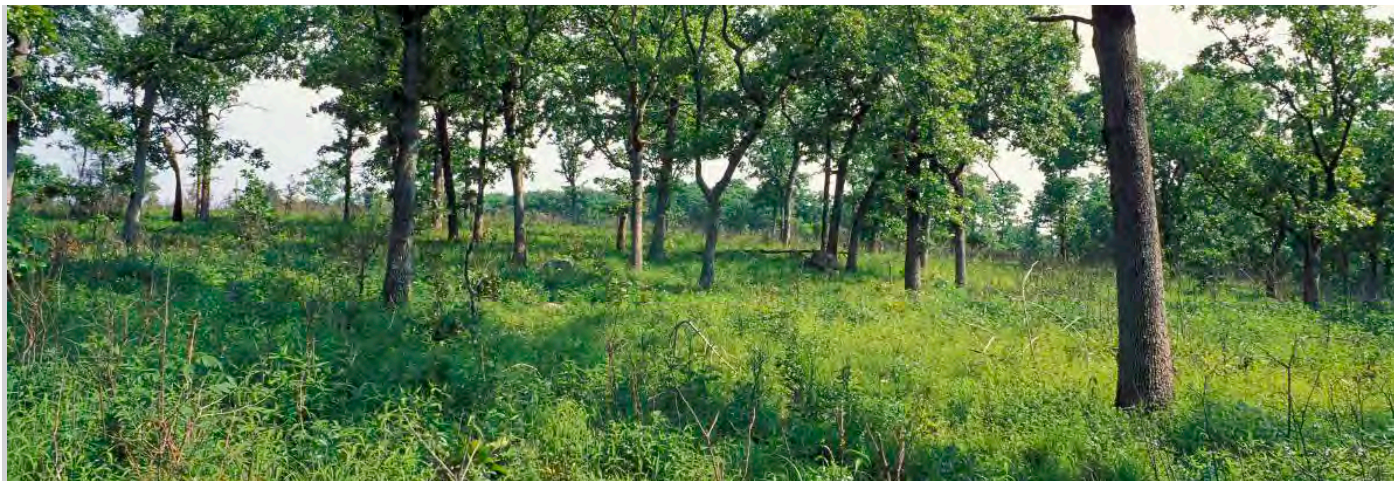


Figure 6. Number of wild turkeys harvested during the fall firearms turkey season in Missouri and the number of fall firearms permits sold, 1978-2022. Permit sales do not include no-cost landowner permits.



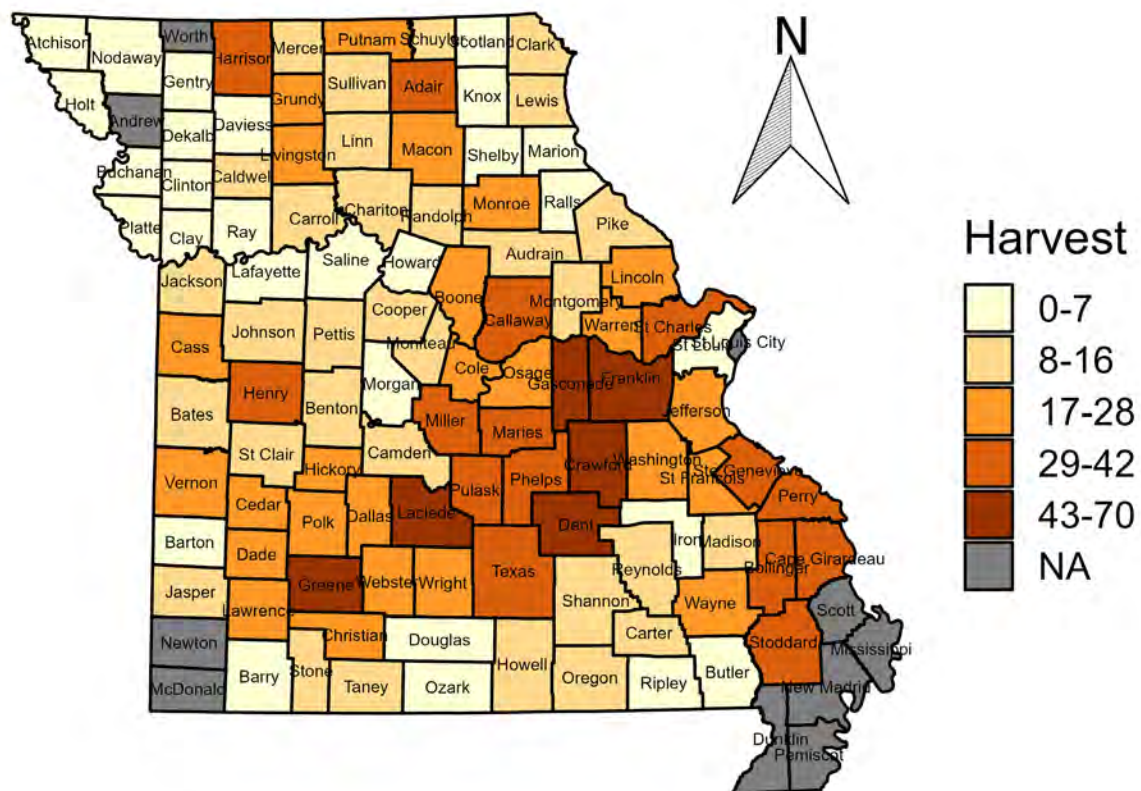
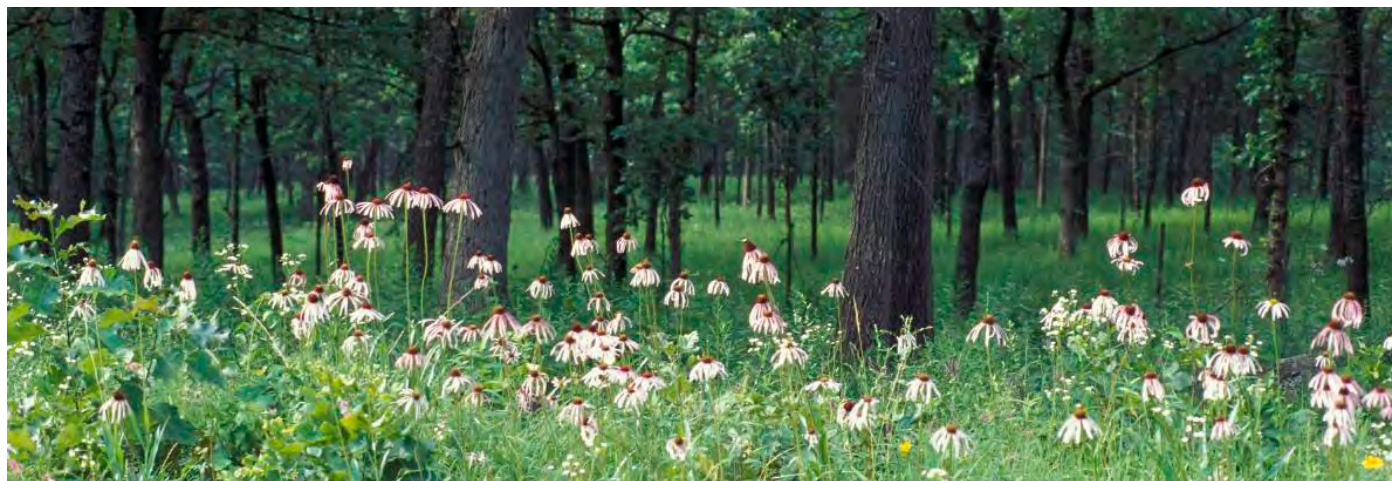


Figure 7. Missouri fall firearms wild turkey harvest, 2022.



2020 Fall Archery Turkey Season

Hunters harvested 2,446 turkeys during the 2022 fall archery deer and turkey season (Figure 8). The 2022 archery turkey harvest total was 3% less than the 2021 harvest total and 1% lower than the previous five-year average. Unlike the fall firearms turkey harvest, which has shown a declining trend since the late 1980s, the fall archery harvest increased steadily until the mid-2000s. Since 2005, annual archery turkey harvests have fluctuated but show a stable to slightly declining trend, overall. The poor production in 2016 and 2017 likely resulted in low harvest in the proceeding years, with 2020 being a deviation from that trend. In 2020, 156,342 fall archery hunting permits were sold, the highest number since the season's inception, while permit sales numbers were down slightly from that high point the last two years, the 2022 sales figure (151,407 permits sold) was still 10% higher than the five-year average (Figure 8). Archery harvest is well distributed across the state (Figure 9). This may be attributed to opportunistic take by hunters who are primarily targeting white-tailed deer.

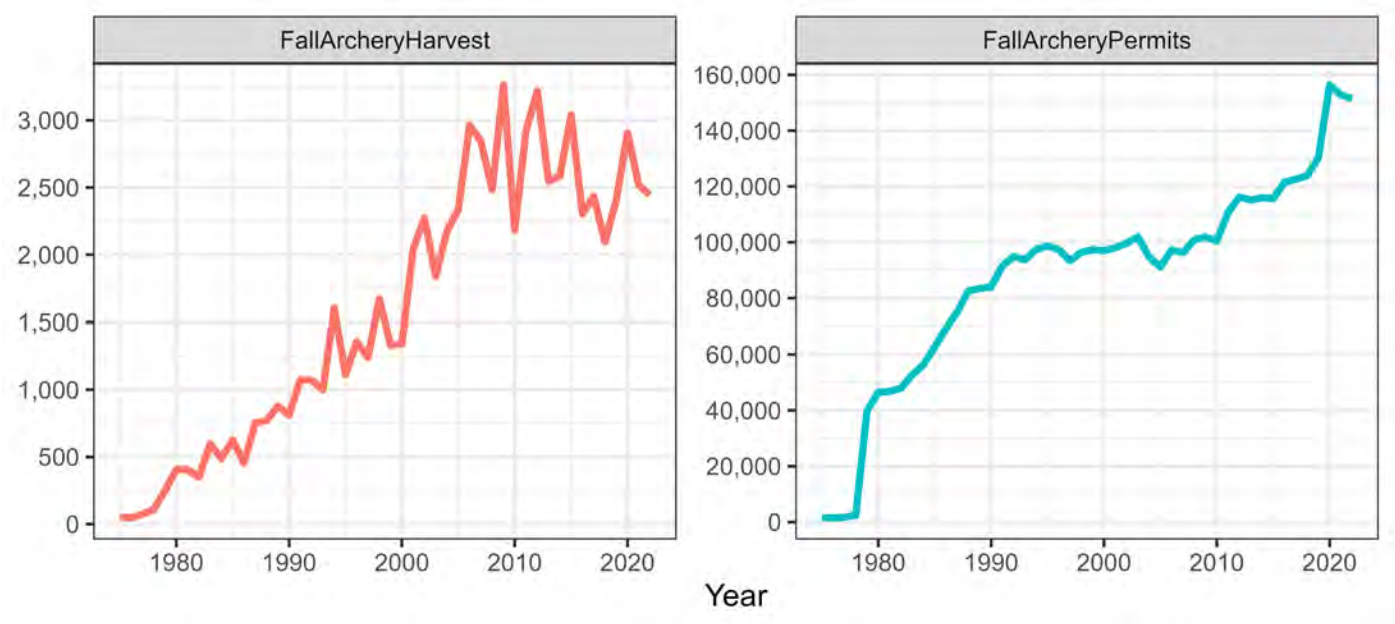


Figure 8. Missouri fall archery permit sales, 1975-2022, compared to fall archery turkey harvest 1975-2020. Permit sales do not include no-cost landowner permits. In 1979, the archery deer and archery turkey permits were combined into one permit.

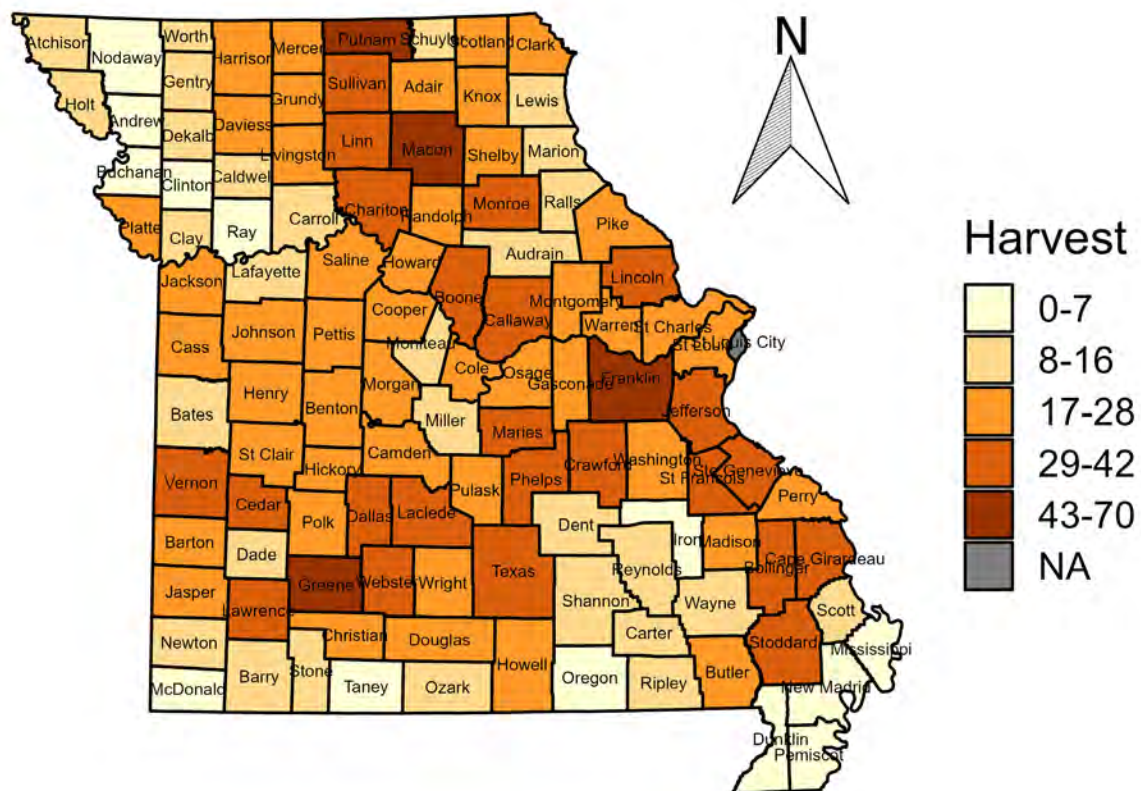
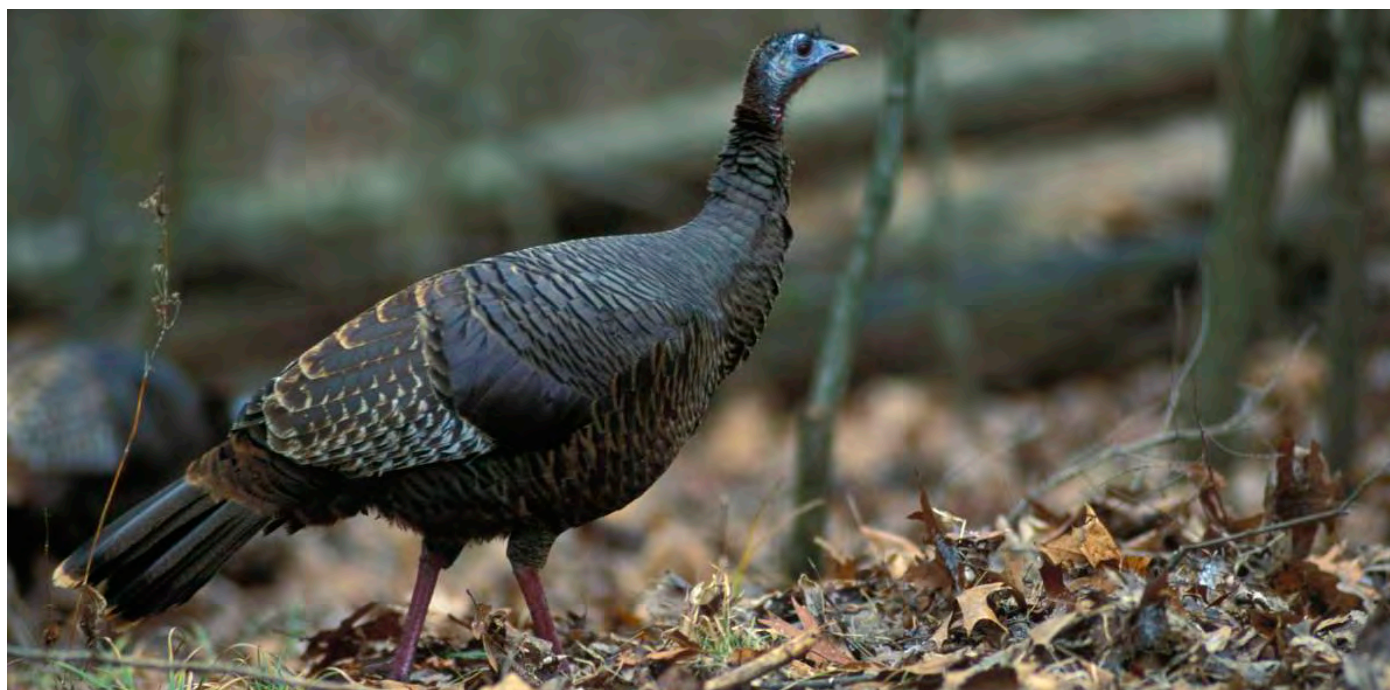


Figure 9. Wild turkey harvest in Missouri during the 2022 fall archery season.



Hunting Incidents

There were two hunting incidents during the 2022 spring turkey season, one fatal and one non-fatal. The number of spring turkey hunting incidents in Missouri has declined considerably over the course of the last three decades. During the late 1980s, more than 30 incidents occurred annually for every 100,000 permits sold. During the last five hunting seasons, the average number of incidents per 100,000 permits sold is 1.2 (**Figure 10**).

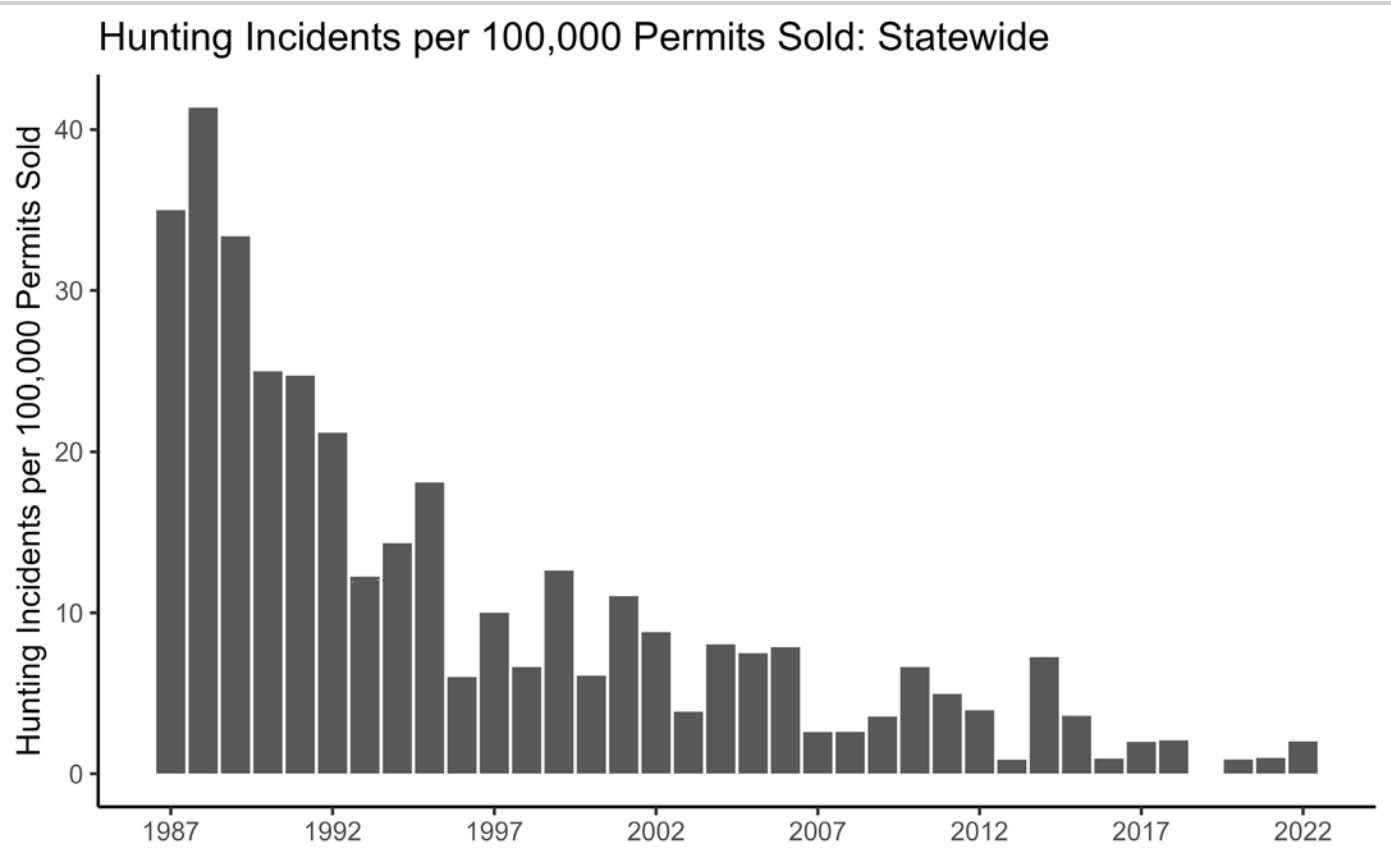


Figure 10. Hunting incidents during the spring turkey season in Missouri per 100,000 permits sold, 1987-2022.

Recent Regulation Changes

Other than changes to some Conservation Area regulations and managed spring turkey hunts, no turkey hunting regulation changes occurred in 2022.



Factors Influencing Wild Turkey Nest Success and Poult Survival in North Missouri

Research Project

Overview

Wild turkey production has exhibited a long-term declining trend, with recent hatches being especially poor. Nest success and poult survival rates from the previous north Missouri study were lower than many previously reported estimates from the literature, and the poult-to-hen ratios calculated from the summer brood survey during the past 4 years are some of the lowest in the state's history. Because of low recruitment, turkey abundance in Missouri could be at its lowest level in decades, generating concern about long-term population viability. Density dependence, large-scale landscape change, changing weather patterns, decreasing insect abundance, and increasing populations of some mesocarnivores could be adversely affecting turkey production. Since these factors have traditionally been studied in isolation, there is an incomplete understanding of how these factors are affecting turkey populations. Improving our understanding of factors affecting turkey nest success and poult survival would provide important information when communicating about declining turkey production and abundance with concerned stakeholders. This information would also inform habitat management efforts on public and private lands in Missouri to increase turkey recruitment and ultimately abundance.

Objectives of this five- and one-half-year cooperative research project with the University of Missouri include:

1. Determine the most effective method of attaching radio-transmitters to turkey poults.
2. Determine how weather (temperature and precipitation), landscape characteristics, predator densities, and their interactions affect turkey nest success.
3. Determine how weather (temperature and precipitation), landscape characteristics, predator densities, and invertebrate abundance affect poult survival, and identify the main causes of poult mortality.
4. Assess turkey brood-rearing habitat selection and determine habitats where turkeys and predators are most likely to interact.

To investigate poult survival and cause-specific mortality, we will deploy Very High Frequency (VHF) radio transmitters onto wild turkey poults. To reduce the potential of researcher-induced poult mortality, we will determine the least invasive and most effective technique for transmitter attachment by testing two methods—glue-on and suture—on captive turkey poults prior to the first field season.

To investigate turkey nest success, poult survival, and brood-rearing habitat selection, we will deploy Global Positioning System-Acceleration-Ultra High Frequency (GPS-ACC-UHF) transmitters on wild turkey hens. Translating ACC data into behavior requires known instances of acceleration attributed to specific behaviors. Thus, we plan to deploy GPS-ACC-UHF tracking devices on captive turkey hens and film >100 instances of common behaviors (e.g., feeding, walking, resting/stationary). We will be able to use the information gathered from the captive turkey hens to determine where, when, and how often wild turkey hens are engaging in specific behaviors.

Field work for this project will cover four nesting and brood-rearing seasons (to capture annual variability in covariates), and work will be conducted in Putnam County, Missouri. Hens will be monitored for productivity and poults will be monitored for survival. Wild turkey nest and poult predators will be monitored for occupancy and density. We will evaluate the effects of habitat, weather, and food availability on turkey reproduction by conducting vegetation surveys, collecting temperature and precipitation data, and collecting insects at systematic locations throughout the study area.

Project Update

In late summer and fall of 2020, researchers at the University of Missouri and MDC constructed an aviary at the University of Missouri's South Farm Research Center. The aviary was designed to house heritage breed domestic poult and hens during the captive trials portion of the project. Eight broods of at least nine heritage breed domestic poult were obtained within 48 hours of hatching. Within each brood, three poult were fit with a VHF radio transmitter that was attached using a glue-on method, three poult were fit with a VHF transmitter that was attached using a suture method, and at least three poult were not fit with a transmitter (control group). The broods were monitored daily for survival, growth, and transmitter retention. The suture method proved to be the most effective method of transmitter attachment during this captive trial.

After the poult captive trial was complete, the research team obtained three heritage breed domestic turkey hens. These hens were fit with the same GPS-ACC-UHF transmitters that would be placed on wild turkey hens that winter. The research team recorded over 40 hours of video of the hens performing various behaviors—foraging, walking, preening, etc. The timing of the video recording, when matched up with the timing of ACC data collection, will allow the research team to translate the ACC data signatures into behaviors. This was an important data collection step, as it will allow the research team to convert ACC data collected from wild turkey hens into known behaviors. This will allow the research team to determine where, when, and for how long wild turkey hens are engaging in certain activities—seeking shelter/cover, foraging for food, etc.—which will be important for evaluating brood-rearing habitat selection.

In 2021, 51 hens were tagged, and 46 survived the entire field season. About 80% of the tagged hens incubated a nest and 15% attempted a re-nest following a failure. The median nesting incubation date in 2021 was 15-May. Of the 39 nests that reached the incubation stage, eight of the initial nest attempts hatched (21%) and one of four re-nests was successful (25%). Note that because wild turkeys do not start continuously incubating nests until the entire clutch is laid, it can be difficult to identify nest attempts that fail prior to incubation. Thus, it is possible that some nest attempts may have gone undetected if the nest failed during the laying stage. In 2021, brood capture was largely a failure with only one poult from one brood receiving a tag.

Trapping in 2022 was a challenge but by the end of the season 23 hens were captured and tagged. Combined with surviving hens from the 2021 season, a total of 62 hens were available at the start of the 2022 field season. At the time of nesting 47 hens were alive, 40 of which reached nest incubation (about 85%) and nine re-nests were attempted. Of 50 total nest attempts, 20% were successful, a decrease of 4.5% from 2021. Nest initiation rates were up 6.5% and re-nesting rates were up 4.5% from 2021. Success of first nest attempts were up 9% from last year, but only 1 in 9 (11.1%) second nests were successful in 2022 vs 1 in 4 (25%) in 2021. Median data at which hens began incubating initial nesting attempts was 6 days later than in 2021.

Due in large part to the use of infrared units, poult captures were much more successful in 2022 compared to 2021. Altogether, 38 poult were captured from 10 broods. Of those 38 poult, 10 survived the 28-day monitoring period and 13 were lost to predators. The ultimate fates of the remaining poult were unknown either because we lost contact with the transmitter before the end of the 28-day period or the tag was recovered separated from the poult but there was no evidence of predation.

Nest site selection in 2021 was heavily skewed towards open fields ($n = 26$), compared to forested habitat ($n = 17$). In open habitat, 12% of nests were successful compared to 41% success in forested landscapes. In 2022, the total nests and successful nests were very similar between the two broad habitat categories. Forested areas hosted 24 nests, of which 21% were successful compared to the 26 nests, 19% success rate, in open habitat types.

The team is conducting a mark-recapture effort of raccoons and opossums at sites across the county to determine how nest predator densities vary by land cover type (i.e., larger tracts of forest versus more open, agriculturally dominated areas). The team has deployed trail cameras with scent stations across the county to determine occupancy of larger poult predators (i.e., coyote, fox) in different land cover types. The team has also deployed weather stations to monitor variation in precipitation and temperature across the area. Vegetation surveys are being conducted at nest sites, at foraging sites used by hens with broods, and at random sites around the area. These surveys will allow the team to determine if vegetative cover influences whether a nest successfully hatches and what sorts of vegetation hens with broods are selecting for versus what is available in the area. The team is also collecting insect samples at the foraging sites used by hens with broods and the random sites to determine which land cover types provide the most food for poult.



Left: Researchers from the University of Missouri capture day-old wild turkey poults in order to attach UHF transmitters to them. This allows the researchers to track their movements and more quickly respond to a mortality event.

Right: Researchers attach a leg band to an adult turkey in an effort to monitor harvest demographics.



Left: Researchers from the University of Missouri and MDC carefully attach a battery-powered GPS-ACC-UHF transmitter to a wild turkey hen captured in Putnam County during February 2021.

Male Harvest Rate Estimation Project

To improve a statistical population reconstruction (SPR) model, via the inclusion of auxiliary studies, MDC is capturing and banding male turkeys in two different turkey productivity regions—regions with high interspersed of forested and open habitats—and monitoring the band returns. During the 2021-2022 winter, 76 males were banded altogether. Half of the banded birds were adults and half were juvenile birds. In 2022, 117 males were banded, 56 adults and 61 juveniles. Of the 193 total males banded, 40 have been reported as harvested, eight of which were jakes, thus far. One more season of banding is approved, more may be possible if necessary.

Hunter Reported Fall Harvest Demographics Project

Like the male harvest rate estimation study, the harvest demographic study is designed to reduce uncertainty in the SPR model. Hunters had the option to opt into the study while securing permits (regular or no-cost landowner permits). Participants were asked to submit the 9th and 10th primary wing feathers and 3-5 breast feathers from birds harvested during the 2022 fall turkey season, both firearms and archery portions. From those feather samples, the turkey program assistant identified the true age and sex from birds and compared those results to what the hunter submitted via telecheck. Efforts were made to avoid describing the project in detail to avoid biasing the sample, though information on how to correctly age and sex turkeys in the fall is, and has been, readily available on the MDC website.

During the first year 291 viable samples were submitted. Overall accuracy across all age and sex classes was 63%. Unsurprisingly, samples submitted from adult (AHY) gobblers had the highest balanced accuracy—the arithmetic mean between sensitivity and specificity—of 92%. Hatch year (HY) hens had the second highest balanced accuracy (71%), followed by HY gobblers (65%) and finally AHY hens (63%). Hatch year and AHY hens had the lowest and second lowest specificity scores, respectively, meaning that there were more false positives for female classes than male classes. For example, 99% of the gobblers submitted as gobblers were indeed gobblers. Only 78% of juvenile hens, by contrast were accurately identified as such. Overall, the age/sex class that was most often incorrectly identified was HY males. Of the 50 HY male samples submitted, 42% were telechecked as AHY females, 36% were accurately identified and 22% were telechecked as HY females. The final takeaway from these preliminary data is that the ratio of harvested males to females was about 60:40. The average male:female ratio, historically, has been around 40:60 according to hunter reported Telecheck records. Whether this inversion was an aberration brought on by a relatively small sample size or not should become clearer over the final two years of the project.



APPENDIX A.

2022 Missouri spring turkey harvest (youth and regular seasons combined).

| County | Adult Males | Subadult Males | Bearded Hens | Total | Rank ^a |
|----------------|-------------|----------------|--------------|-------|-------------------|
| Adair | 369 | 56 | 5 | 430 | 26 |
| Andrew | 99 | 18 | 1 | 118 | 102 |
| Atchison | 87 | 15 | 0 | 102 | 108 |
| Audrain | 129 | 38 | 0 | 167 | 95 |
| Barry | 65 | 46 | 0 | 111 | 104 |
| Barton | 185 | 61 | 1 | 247 | 69 |
| Bates | 203 | 65 | 0 | 268 | 66 |
| Benton | 335 | 85 | 3 | 423 | 30 |
| Bollinger | 350 | 95 | 8 | 453 | 19 |
| Boone | 466 | 105 | 7 | 578 | 10 |
| Buchanan | 73 | 26 | 0 | 99 | 109 |
| Butler | 78 | 25 | 1 | 104 | 106 |
| Caldwell | 188 | 42 | 0 | 230 | 74 |
| Callaway | 513 | 136 | 11 | 660 | 4 |
| Camden | 426 | 66 | 7 | 499 | 17 |
| Cape Girardeau | 329 | 109 | 2 | 440 | 24 |
| Carroll | 292 | 25 | 0 | 317 | 54 |
| Carter | 129 | 37 | 0 | 166 | 96 |
| Cass | 283 | 69 | 2 | 354 | 41 |
| Cedar | 374 | 48 | 5 | 427 | 28 |
| Chariton | 273 | 51 | 1 | 325 | 50 |
| Christian | 224 | 64 | 7 | 295 | 59 |
| Clark | 299 | 38 | 4 | 341 | 44 |
| Clay | 104 | 28 | 0 | 132 | 100 |
| Clinton | 78 | 26 | 1 | 105 | 105 |
| Cole | 356 | 70 | 5 | 431 | 25 |
| Cooper | 258 | 66 | 4 | 328 | 47 |
| Crawford | 357 | 82 | 8 | 447 | 22 |
| Dade | 219 | 74 | 4 | 297 | 58 |
| Dallas | 281 | 72 | 1 | 354 | 42 |
| Daviess | 350 | 84 | 7 | 441 | 23 |
| Dekalb | 142 | 30 | 2 | 174 | 92 |
| Dent | 385 | 93 | 13 | 491 | 18 |
| Douglas | 243 | 67 | 3 | 313 | 56 |
| Dunklin | 13 | 7 | 0 | 20 | 114 |
| Franklin | 634 | 223 | 12 | 869 | 1 |
| Gasconade | 505 | 149 | 12 | 666 | 2 |
| Gentry | 187 | 34 | 2 | 223 | 78 |
| Greene | 402 | 109 | 6 | 517 | 15 |
| Grundy | 280 | 34 | 11 | 325 | 51 |

| County | Adult Males | Subadult Males | Bearded Hens | Total | Rank ^a |
|-------------|-------------|----------------|--------------|-------|-------------------|
| Harrison | 506 | 63 | 9 | 578 | 11 |
| Henry | 307 | 64 | 7 | 378 | 38 |
| Hickory | 274 | 59 | 5 | 338 | 45 |
| Holt | 181 | 32 | 1 | 214 | 81 |
| Howard | 280 | 44 | 3 | 327 | 49 |
| Howell | 206 | 76 | 6 | 288 | 63 |
| Iron | 121 | 29 | 1 | 151 | 98 |
| Jackson | 109 | 36 | 2 | 147 | 99 |
| Jasper | 190 | 65 | 5 | 260 | 67 |
| Jefferson | 296 | 87 | 4 | 387 | 36 |
| Johnson | 320 | 85 | 6 | 411 | 31 |
| Knox | 177 | 25 | 2 | 204 | 84 |
| Laclede | 440 | 129 | 16 | 586 | 9 |
| Lafayette | 174 | 46 | 0 | 220 | 80 |
| Lawrence | 242 | 72 | 3 | 317 | 55 |
| Lewis | 166 | 34 | 2 | 202 | 86 |
| Lincoln | 228 | 92 | 5 | 325 | 52 |
| Linn | 353 | 55 | 3 | 411 | 32 |
| Livingston | 310 | 70 | 5 | 385 | 37 |
| Macon | 466 | 89 | 9 | 564 | 12 |
| Madison | 150 | 53 | 0 | 203 | 85 |
| Maries | 414 | 133 | 10 | 557 | 13 |
| Marion | 197 | 28 | 2 | 227 | 75 |
| McDonald | 72 | 31 | 0 | 103 | 107 |
| Mercer | 392 | 30 | 4 | 426 | 29 |
| Miller | 478 | 116 | 7 | 601 | 7 |
| Mississippi | 66 | 19 | 0 | 85 | 111 |
| Moniteau | 264 | 88 | 6 | 358 | 40 |
| Monroe | 268 | 53 | 4 | 325 | 53 |
| Montgomery | 238 | 90 | 7 | 335 | 46 |
| Morgan | 309 | 58 | 0 | 367 | 39 |
| New Madrid | 58 | 24 | 0 | 82 | 112 |
| Newton | 77 | 34 | 2 | 113 | 103 |
| Nodaway | 162 | 33 | 1 | 196 | 88 |
| Oregon | 169 | 32 | 0 | 201 | 87 |
| Osage | 518 | 129 | 14 | 661 | 3 |
| Ozark | 133 | 53 | 1 | 187 | 89 |
| Pemiscot | 38 | 9 | 0 | 47 | 113 |
| Perry | 302 | 98 | 1 | 401 | 34 |
| Pettis | 191 | 46 | 1 | 238 | 70 |

| County | Adult Males | Subadult Males | Bearded Hens | Total | Rank ^a |
|------------------|-------------|----------------|--------------|-------|-------------------|
| Phelps | 474 | 137 | 5 | 617 | 6 |
| Pike | 206 | 65 | 7 | 278 | 64 |
| Platte | 148 | 21 | 5 | 174 | 93 |
| Polk | 300 | 85 | 9 | 394 | 35 |
| Pulaski | 352 | 90 | 7 | 449 | 20 |
| Putnam | 452 | 65 | 4 | 521 | 14 |
| Ralls | 171 | 38 | 3 | 212 | 82 |
| Randolph | 240 | 52 | 2 | 294 | 60 |
| Ray | 143 | 29 | 1 | 173 | 94 |
| Reynolds | 58 | 17 | 3 | 178 | 91 |
| Ripley | 127 | 52 | 0 | 179 | 90 |
| Saint Charles | 172 | 54 | 1 | 227 | 76 |
| Saint Clair | 363 | 80 | 4 | 448 | 21 |
| Saint Francois | 249 | 52 | 2 | 303 | 57 |
| Saint Louis | 74 | 24 | 1 | 99 | 110 |
| Sainte Genevieve | 47 | 110 | 4 | 591 | 8 |
| Saline | 246 | 42 | 3 | 291 | 62 |
| Schuyler | 207 | 27 | 2 | 236 | 71 |
| Scotland | 256 | 35 | 1 | 292 | 61 |
| Scott | 125 | 32 | 5 | 162 | 97 |
| Shannon | 187 | 45 | 3 | 235 | 72 |
| Shelby | 183 | 28 | 0 | 211 | 83 |
| Stoddard | 195 | 60 | 2 | 257 | 68 |
| Stone | 171 | 50 | 3 | 224 | 77 |
| Sullivan | 431 | 67 | 7 | 505 | 16 |
| Taney | 174 | 59 | 2 | 235 | 73 |
| Texas | 484 | 149 | 15 | 648 | 5 |
| Vernon | 334 | 92 | 4 | 430 | 27 |
| Warren | 189 | 70 | 10 | 269 | 65 |
| Washington | 277 | 47 | 4 | 328 | 48 |
| Wayne | 168 | 53 | 0 | 221 | 79 |
| Webster | 263 | 87 | 4 | 354 | 43 |
| Worth | 102 | 20 | 1 | 123 | 101 |
| Wright | 292 | 108 | 4 | 404 | 33 |

^aRank based on total harvest in Missouri's 114 counties.

APPENDIX B.

2019 Missouri fall turkey harvest (firearms and archery seasons combined).

| County | Adult Males | Subadult Males | Adult Females | Subadult Females | Total | Rank ^a |
|----------------|-------------|----------------|---------------|------------------|-------|-------------------|
| Adair | 12 | 10 | 20 | 17 | 59 | 19 |
| Andrew | 4 | 0 | 4 | 1 | 9 | 105 |
| Atchison | 4 | 2 | 7 | 5 | 18 | 89 |
| Audrain | 3 | 1 | 2 | 3 | 9 | 106 |
| Barry | 7 | 5 | 7 | 1 | 20 | 86 |
| Barton | 8 | 3 | 10 | 0 | 21 | 84 |
| Bates | 5 | 4 | 8 | 8 | 25 | 73 |
| Benton | 13 | 7 | 12 | 6 | 38 | 47 |
| Bollinger | 15 | 5 | 20 | 24 | 64 | 15 |
| Boone | 21 | 8 | 21 | 14 | 34 | 16 |
| Buchanan | 1 | 0 | 5 | 1 | 7 | 109 |
| Butler | 7 | 3 | 6 | 6 | 22 | 83 |
| Caldwell | 8 | 3 | 8 | 5 | 24 | 74 |
| Callaway | 16 | 8 | 27 | 22 | 73 | 9 |
| Camden | 11 | 5 | 15 | 2 | 33 | 55 |
| Cape Girardeau | 14 | 8 | 28 | 21 | 71 | 10 |
| Carroll | 12 | 4 | 4 | 4 | 24 | 75 |
| Carter | 4 | 4 | 5 | 10 | 23 | 79 |
| Cass | 13 | 14 | 18 | 9 | 54 | 26 |
| Cedar | 27 | 7 | 19 | 4 | 57 | 21 |
| Chariton | 13 | 7 | 13 | 10 | 43 | 43 |
| Christian | 6 | 6 | 21 | 5 | 38 | 48 |
| Clark | 4 | 5 | 11 | 6 | 26 | 71 |
| Clay | 8 | 0 | 1 | 4 | 13 | 96 |
| Clinton | 0 | 0 | 5 | 3 | 8 | 107 |
| Cole | 16 | 4 | 11 | 14 | 45 | 41 |
| Cooper | 11 | 5 | 8 | 7 | 31 | 59 |
| Crawford | 19 | 7 | 24 | 27 | 77 | 5 |
| Dade | 11 | 5 | 9 | 12 | 37 | 51 |
| Dallas | 17 | 7 | 21 | 5 | 50 | 33 |
| Daviess | 7 | 6 | 10 | 7 | 30 | 62 |
| Dekalb | 1 | 4 | 6 | 4 | 15 | 93 |
| Dent | 14 | 15 | 19 | 15 | 63 | 17 |
| Douglas | 7 | 4 | 11 | 2 | 24 | 76 |
| Dunklin | 0 | 0 | 1 | 0 | 1 | 114 |
| Franklin | 35 | 25 | 41 | 35 | 136 | 1 |
| Gasconade | 24 | 13 | 19 | 21 | 77 | 6 |
| Gentry | 3 | 2 | 4 | 6 | 15 | 94 |
| Greene | 28 | 11 | 55 | 17 | 111 | 2 |

| County | Adult Males | Subadult Males | Adult Females | Subadult Females | Total | Rank ^a |
|-------------|-------------|----------------|---------------|------------------|-------|-------------------|
| Grundy | 14 | 2 | 13 | 8 | 37 | 52 |
| Harrison | 25 | 4 | 19 | 11 | 59 | 20 |
| Henry | 10 | 5 | 23 | 19 | 57 | 22 |
| Hickory | 15 | 4 | 9 | 16 | 44 | 42 |
| Holt | 4 | 0 | 7 | 2 | 13 | 97 |
| Howard | 14 | 0 | 12 | 0 | 26 | 72 |
| Howell | 7 | 5 | 8 | 10 | 30 | 63 |
| Iron | 5 | 2 | 2 | 2 | 11 | 102 |
| Jackson | 10 | 2 | 16 | 3 | 31 | 60 |
| Jasper | 11 | 6 | 15 | 0 | 32 | 56 |
| Jefferson | 18 | 6 | 21 | 9 | 54 | 27 |
| Johnson | 14 | 2 | 16 | 7 | 39 | 46 |
| Knox | 11 | 6 | 5 | 7 | 30 | 64 |
| Laclede | 31 | 6 | 20 | 28 | 85 | 4 |
| Lafayette | 5 | 1 | 5 | 3 | 14 | 95 |
| Lawrence | 18 | 10 | 21 | 8 | 57 | 23 |
| Lewis | 3 | 3 | 12 | 10 | 28 | 69 |
| Lincoln | 17 | 11 | 17 | 17 | 62 | 18 |
| Linn | 11 | 6 | 22 | 10 | 49 | 35 |
| Livingston | 9 | 6 | 17 | 10 | 42 | 44 |
| Macon | 25 | 16 | 36 | 17 | 94 | 3 |
| Madison | 2 | 3 | 14 | 10 | 29 | 66 |
| Maries | 29 | 11 | 11 | 16 | 67 | 13 |
| Marion | 4 | 4 | 5 | 6 | 19 | 87 |
| McDonald | 4 | 0 | 0 | 2 | 6 | 111 |
| Mercer | 15 | 2 | 14 | 7 | 38 | 49 |
| Miller | 8 | 7 | 15 | 16 | 46 | 40 |
| Mississippi | 2 | 1 | 2 | 0 | 5 | 112 |
| Moniteau | 8 | 1 | 6 | 8 | 23 | 80 |
| Monroe | 20 | 5 | 16 | 15 | 56 | 25 |
| Montgomery | 8 | 9 | 14 | 7 | 38 | 50 |
| Morgan | 9 | 1 | 9 | | 24 | 77 |
| New Madrid | 2 | 0 | 1 | 0 | 3 | 113 |
| Newton | 3 | 1 | 9 | 0 | 13 | 98 |
| Nodaway | 2 | 3 | 4 | 2 | 11 | 103 |
| Oregon | 7 | 4 | 4 | 2 | 17 | 91 |
| Osage | 24 | 6 | 11 | 8 | 49 | 36 |
| Ozark | 3 | 1 | 4 | 3 | 11 | 104 |
| Pemiscot | 1 | 1 | 5 | 0 | 7 | 110 |

| County | Adult Males | Subadult Males | Adult Females | Subadult Females | Total | Rank ^a |
|------------------|-------------|----------------|---------------|------------------|-------|-------------------|
| Perry | 11 | 8 | 18 | 14 | 51 | 32 |
| Pettis | 9 | 3 | 11 | 5 | 28 | 70 |
| Phelps | 28 | 16 | 14 | 12 | 70 | 11 |
| Pike | 7 | 4 | 13 | 10 | 34 | 54 |
| Platte | 10 | 1 | 10 | 2 | 23 | 81 |
| Polk | 13 | 9 | 17 | 8 | 47 | 39 |
| Pulaski | 17 | 10 | 13 | 12 | 52 | 31 |
| Putnam | 20 | 15 | 30 | 9 | 74 | 7 |
| Ralls | 5 | 1 | 5 | 2 | 13 | 99 |
| Randolph | 14 | 5 | 11 | 6 | 36 | 53 |
| Ray | 2 | 0 | 8 | 2 | 12 | 101 |
| Reynolds | 3 | 2 | 6 | 5 | 16 | 92 |
| Ripley | 6 | 0 | 7 | 6 | 19 | 88 |
| Saint Charles | 11 | 7 | 26 | 9 | 53 | 29 |
| Saint Clair | 8 | 1 | 15 | 6 | 30 | 65 |
| Saint Francois | 11 | 5 | 19 | 18 | 53 | 30 |
| Saint Louis | 13 | 1 | 10 | 8 | 32 | 57 |
| Sainte Genevieve | 12 | 6 | 28 | 23 | 69 | 12 |
| Saline | 4 | 0 | 14 | 5 | 23 | 82 |
| Schuyler | 5 | 3 | 11 | 5 | 24 | 78 |
| Scotland | 12 | 10 | 4 | 5 | 31 | 61 |
| Scott | 2 | 2 | 9 | 0 | 13 | 100 |
| Shannon | 1 | 5 | 6 | 9 | 21 | 85 |
| Shelby | 10 | 1 | 9 | 9 | 29 | 67 |
| Stoddard | 9 | 13 | 34 | 18 | 74 | 8 |
| Stone | 11 | 4 | 6 | 8 | 29 | 68 |
| Sullivan | 19 | 1 | 12 | 9 | 41 | 45 |
| Taney | 5 | 1 | 8 | 4 | 18 | 90 |
| Texas | 16 | 11 | 20 | 18 | 65 | 14 |
| Vernon | 14 | 8 | 22 | 10 | 54 | 28 |
| Warren | 14 | 5 | 17 | 13 | 49 | 37 |
| Washington | 18 | 6 | 20 | 6 | 50 | 34 |
| Wayne | 4 | 6 | 11 | 11 | 32 | 58 |
| Webster | 17 | 12 | 15 | 13 | 57 | 24 |
| Worth | 4 | 0 | 3 | 1 | 8 | 108 |
| Wright | 12 | 6 | 15 | 16 | 49 | 38 |

^aRank based on total harvest in Missouri's 114 counties.



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